STAT/MA 41600
In-Class Problem Set #31: October 26, 2016

1. Consider two independent random variables X and Y that are each uniformly distributed on the interval $[0, 10]$.

Find $P(|X - Y| < 1)$, i.e., find the probability that X and Y are less than 1 unit apart. Hint: Think about the 10×10 grid where (X, Y) is located. What is the area of the region where $|X - Y| < 1$?

2. Suppose that the grades of two students are independent and each are uniformly distributed in the interval $[90, 100]$. Find the probability that the sum of the two grades is 197 or higher.

3. Suppose that U is uniformly distributed on the interval $[0, 5]$.
3a. What is the CDF of U?
3b. Now define $X = 3U + 2$. What is the CDF of X?
3c. What kind of distribution does X have?

4. Let U and V be independent and uniformly distributed on the interval $[0, 3]$.

Let $X = \max(U, V)$. Let $Y = \min(U, V)$.
4a. What is the CDF of X?
4b. What is the probability density function of X?
4c. What is the CDF of Y?
4d. What is the probability density function of Y?